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## Clinico-epidemiological pattern of canine distemper in Chennai: An update

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### Abstract

Canine Distemper becomes a major threat among canine population in India. The disease has already reached the endemic status in Tamil Nadu. But recently, changes in epidemiological factors for the occurrence of the disease were observed. To update the current epidemiological pattern of the disease, dogs which were brought to Infectious Disease Unit, Madras Veterinary College Teaching Hospital, Chennai from April 2021 to September 2022 with the symptoms of Canine Distemper were used for the present study. The epidemiological data such as age, breed, sex, season, and vaccination status were collected from the animals which were found positive for Canine Distemper by Reverse Transcriptase Polymerase Chain Reaction. The data were compared with retrospective data in the same area for temporal distribution. The comparison of five years data was used to get a clear clinico-epidemiological pattern of the disease and also to predict future occurrence of the disease.

**Keywords:** Canine distemper, epidemiologic pattern, clinical incidence

### 1. Introduction

Canine Distemper, (CD) is an important viral disease and is caused by a morbillivirus that becomes a common disease among canine population worldwide. The endemic nature of the disease, changes in seasonal prevalence and the resultant high morbidity as well as mortality in many dogs including stray dogs are the big challenges for Veterinarians despite following the regular vaccination schedule in dogs in India. The virus initially infects monocytes within lymphoid tissue in the upper respiratory tract and tonsils and is subsequently disseminated via the lymphatics and reaches entire reticuloendothelial system through blood. The clinical sign starts with fever which is followed by loss of appetite, slight depression, ocular, nasal discharge and tonsillitis in most of the infections. By day 10 post infection, CDV localized in epithelial cells and it is manifested as respiratory, gastrointestinal and/or dermatologic signs. Though many previous studies revealed various risk factors for the occurrence of Canine Distemper, changes in epidemiological pattern are recently observed worldwide particularly in season due to global warming or climatic change. Hence frequent update of epidemiological pattern of the disease in any particular area has become mandate to prevent the occurrence of the disease.

### 2. Materials and Methods

#### 2.1 Epidemiological data collection

A total of 163 dogs were selected for the study from April 2021 to September 2022 at Infectious Disease Unit, Madras Veterinary College Teaching Hospital, Chennai-7 since their clinical manifestation were suggestive for Canine Distemper. Out of 163 dogs, epidemiological data such as age, breed, sex, season and vaccination status were collected from 131 dogs which were positive for CD by RT-PCR. Retrospective seasonal data of canine distemper for the past 4 years in the same study area was also collected from January, 2017 to March, 2021.

#### 2.2 Sample collection and RNA extraction

RNA was extracted from epithelial cells such as conjunctival, nasal and genital swabs by Trizol method (Agnihotri *et al.*, 2017) <sup>[1]</sup>. QIAamp viral RNA mini kit (QIAGEN, Cat No: 52904) was used for RNA extraction from buffy coat and urine (Zanian *et al.*, 2021) <sup>[12]</sup>.

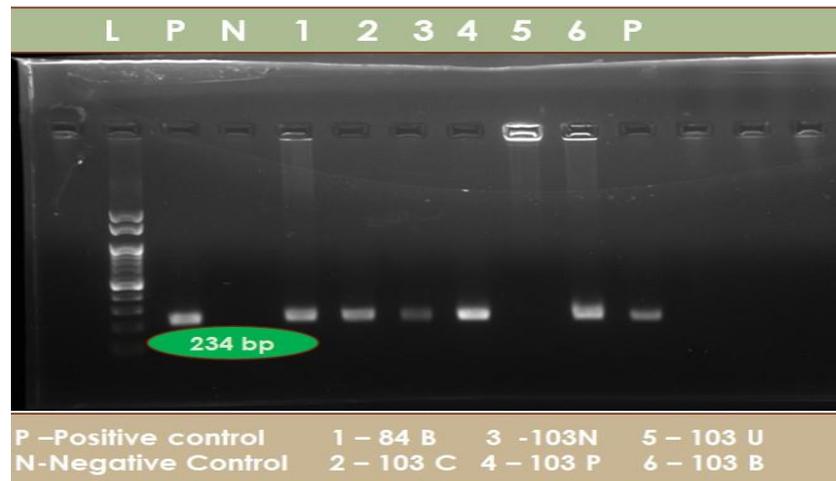
### 2.3 c-DNA conversion and RT-PCR

Bio-Rad i-Script C-DNA synthesis kit was used for cDNA conversion. Upon RNA extraction, the reaction recipe was prepared for the total volume of 20µl. The cyclical condition followed for conversion of cDNA includes priming (5 min at 25 °C; reverse transcription (20 min at 46 °C); reverse transcription inactivation (1 min at 95 °C). The synthesized cDNA was stored at -20 °C until use. Primers of nRT-PCR and cyclical conditions were designed as per Alcalde *et al.*

(2013) [2]. Puppy DP (Nobivac) vaccine was used as a control.

### 3. Results and Discussion

After subjecting a sample (at least one out of five samples such as conjunctival, nasal, genital, buffy coat and urine) of 163 dogs to RT-PCR, 131 dogs were positive for Canine Distemper by RT-PCR (Fig.1). Epidemiological data of 131 dogs were subjected to analysis.



**Note:** B-Buffy coat, N- Nasal swab, C-Conjunctival swab U-Urine, P-Prepuccial swab

**Fig 1:** Sample showing RT-PCR positive results

### 3.1 Age-wise case prevalence

Out of 131 dogs, 38 (29 percent) were of below 6 months of age, 28 (21.37 percent) were above 1.5 years but below 3 years of age, 24 (18.32 percent) were of above 3 years of age, 23 (17.55) were in the group between 6 and 12 months of age and 18 (13.74) dogs were between 12 and 16 months of age.

### 3.2 Breed-wise case Prevalence

Majority, 82 dogs (62.60 percent) were non-descriptive out of 131 dogs, whereas 49 dogs (37.40 percent) were cross-bred.

### 3.3 Sex-wise case prevalence

Males, (88 dogs, 67.18 percent) had higher case prevalence of Canine Distemper than females, 43 dogs (32.82 percent).

### 3.4 Season-wise case prevalence

Out of four categories in the present study, Summer (March to May) had highest number (51) of Canine distemper cases which was closely followed by Winter (December to February) with 42 cases. Southwest monsoon (June to September) and North east Monsoon (October to November) had 22 and 16 cases respectively. The comparison of retrospective seasonal data of past 4 years and present data revealed that more CD cases were recorded in winter months in 2017(December) and 2018 (February), the cases were started slightly increasing in march (summer) in 2019 and again highest cases recorded in february in both 2020 and 2021. Whereas, in 2022, highest cases recorded in April (Summer).

### 3.5 Case Prevalence based on Vaccination status

Out of 131 dogs, 89 (67.94 percent) were non-vaccinated, rest of 42 (32.06 percent) were vaccinated. Out of the 42 vaccinated dogs, only one had regularly vaccinated. One primary dose, 2 doses, 3 doses of vaccine had been received

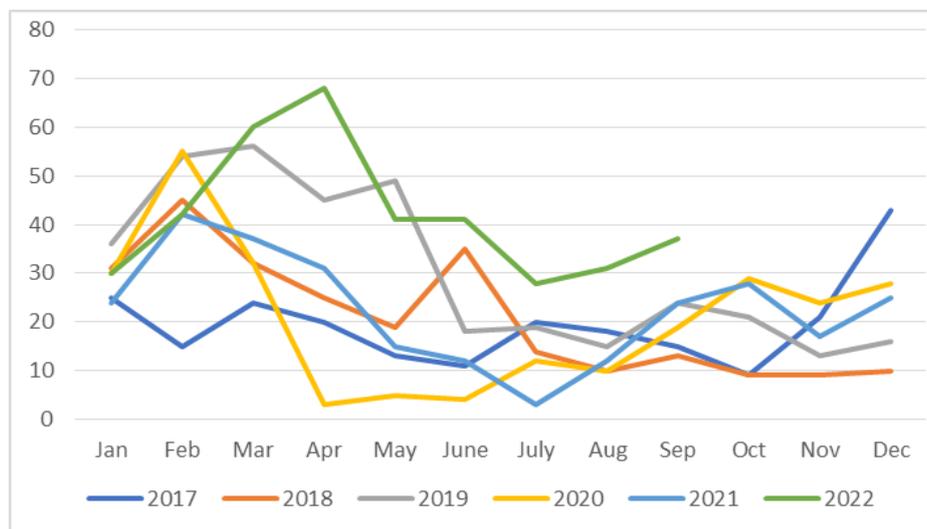
by 23, 4 and 6 dogs respectively. Irregularly vaccinated were 4 dogs and history of vaccination was not known for 4 dogs.

**Table 1:** Number of CD cases recorded at Infectious Disease Unit, Madras Veterinary College

Month	2017	2018	2019	2020	2021	2022
Jan	25	31	36	30	24	30
Feb	15	45	54	55	42	42
Mar	24	32	56	32	37	60
Apr	20	25	45	3	31	68
May	13	19	49	5	15	41
June	11	35	18	4	12	41
July	20	14	19	12	3	28
Aug	18	10	15	10	12	31
Sep	15	13	24	19	24	37
Oct	9	9	21	29	28	
Nov	21	9	13	24	17	
Dec	43	10	16	28	25	

**Note:** highest number shown as bold

In the present study highest number of cases were present in the age group below 6 months and our results are in agreement with the findings of Martella *et al.* (2008) [8]; Appel (1987) [3]; Greene and Appel (2006) [4] and Kim *et al.* (2006) [5]. Immature dogs which did not adequately vaccinated or without adequate immunity by maternal antibodies are more susceptible to CDV infection. Majority of CD infected dogs were non-descriptive in the present study. The reasons might be the local non-descript dogs might not be vaccinated regularly against CD and moreover, their population are higher than cross bred as well as pure breed dogs, which make them most susceptible to the disease. In contrast, Latha *et al.* (2007) [6] stated that spitz was affected to a greater extent in getting CDV infection when compared to other breeds. But Twark *et al.* (2000) [13] stated that breed has no relation with occurrence of the Canine Distemper in dogs.



**Fig 2:** Temporal distribution of Canine Distemper cases in Chennai from January 2017 to September 2022

In the present study, males had higher case prevalence of CD than females. The roaming and hunting nature of males might be the reasons for the higher prevalence. Mahajan *et al.* (2018) <sup>[7]</sup> also observed that male were 2.288 times more prone to CD than female. On the other hand, Shabbir *et al.* (2010) <sup>[10]</sup> reported that CD in India was prevalent in both sexes equally. Sex wise difference in incidence of CD may be due to difference in sex steroids of different sexes.

Our seasonal prevalence is not in agreement with Martella *et al.* (2008) <sup>[8]</sup> who observed the role of temporal fluctuations in disease prevalence of CD with increased frequency of cases during the cold season. Big difference was noted in number of cases between winter and summer with the highest in summer. This sudden change of seasonal occurrence of the disease might be global warming and weather change with unexpected record of rainfall almost all over the year esp. in 2022. Though, out of 131 dogs, 89 were non-vaccinated, rest of 42 were vaccinated, only one had regularly vaccinated out of 42 vaccinated dogs. Others were irregularly vaccinated. Patronek *et al.* (1995) <sup>[9]</sup> also demonstrated that the lack of vaccination against Canine Distemper was associated with several hundred-fold increase in the risk of the disease.

### 3. Conclusion

Canine distemper is one of the important diseases which causes high mortality. Hence it is important to know the changes in epidemiological pattern of the disease in any particular area. With the regular update of temporal distribution, it is easy to predict the season of future occurrence of the disease. Earlier diagnosis with better knowledge of epidemiological pattern will definitely be helpful in reducing the severity of the disease.

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